LIBRARY OF CONGRESS
COPYRIGHT
JUL 19 1887
30800
CITY OF WASHINGTON

PRICE 15 CENTS

JULY 16, 1887.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. XXII. REGULAR EDITION NO. 603.

ARCHITECTURE

ENGINEERING

DECORATION

CONSTRUCTION

TICKNOR & COMPANY

BOSTON MASS.

CONTENTS.

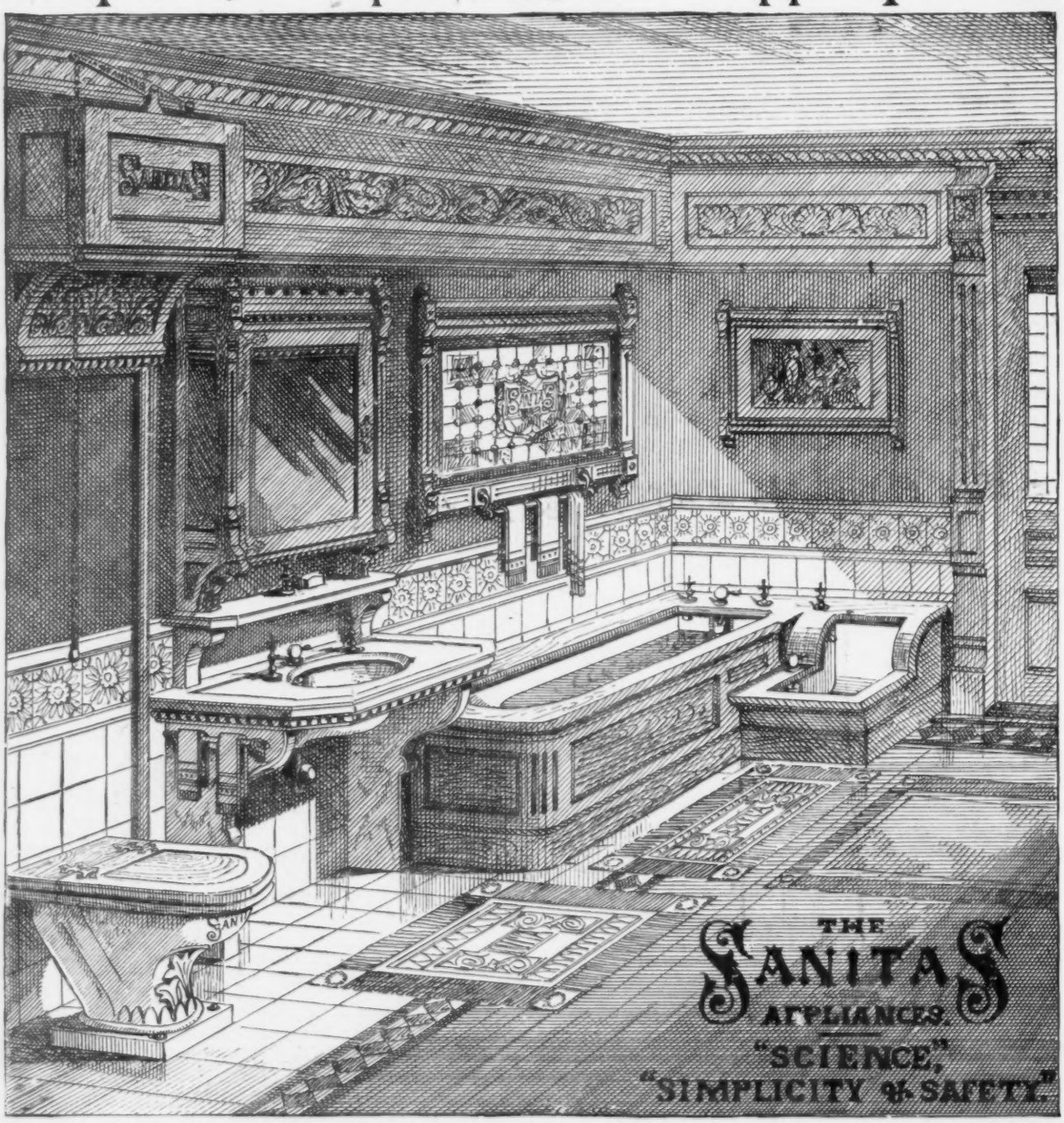
Editorial Summary.
Notes of Travel.—Buffalo.
Exhibition of Building Materials at the Brussels Bourse.
Trades-Unions in America.
Books and Papers.
Notes and Clippings.
Trade Surveys.

ILLUSTRATIONS.

House of J. G. Mitchell, Esq., Brookline, Mass.
(Gelatine Print issued only with Imperial Edition.)
House at Buffalo, N. Y.
National Monuments.—II.
Sketches at Buffalo, N. Y.
Palacio Polentinos, Avila, Spain.

VIEW OF BATH-ROOM FITTED UP WITH THE

SANITAS PLUMBING APPLIANCES



THE "SANITAS" MANUFACTURING CO., 207 TREMONT ST., BOSTON, MASS.

AGENTS: For N. Y. City and vicinity, Miller & Coates, 279 Pearl St., N. Y. For New England, C. G. Cunningham, 207 Tremont St., Boston.

T. H. DUGGAN, 141 Dartmouth Street, BOSTON, MASS. TELEPHONE, 4165 } Will execute anywhere, in first-class manner, small or large contracts for PLUMBING

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXII. Copyright, 1887, by TICKNOR & COMPANY, Boston, Mass. No. 603.

JULY 16, 1887.

Entered at the Post-Office at Boston as second-class matter.

CONTENTS

SUMMARY: —
Statistics of Labor.—Statistics concerning Boy and Girl Labor. —The Competition for the Front of Milan Cathedral. — The Modern Tin-plate.—A famous Cement for Mending Stone. — Discoveries in Pelasgic Art. 25
NOTES OF TRAVEL — BUFFALO. 27
THE ILLUSTRATIONS: —
House of J. G. Mitchell, Esq., Brookline, Mass. — House of G. H. Dunbar, Esq., Buffalo, N. Y. — National Monuments, II. —Sketches at Buffalo, N.Y.—The Palacio Polentinos, Avila, Spain. 28
EXHIBITION OF BUILDING MATERIALS AT THE BRUSSELS BOURSE. 28
TRADES-UNIONS IN AMERICA. 29
BOOKS AND PAPERS. 30
NOTES AND CLIPPINGS. 31
TRADE SURVEYS. 32

IT is a great pity that the public departments devoted to preparing Statistics of Labor which now exist in many of our States cannot, if they are necessary at all, be put in charge of some one capable of managing them with some profit to his fellow-citizens. We acknowledge that we have a great distrust of statistics in general, and of all statistics, those relating to the characters and lives of people whose education has not fitted them for comprehending questions clearly, or answering them directly, or for telling the exact truth without ornamental additions, are the least to be believed in; and when, as seems to be usually the case, the collection of such information is left to persons who supply from their imaginations the facts which they have forgotten to collect, or generalize on the most important points from two or three bits of doubtful evidence, or who dislike to take the trouble to ask questions, and content themselves with getting their knowledge out of newspapers, the result is about as worthless as anything in the form of statistics could well be. We remember a case where a State statistician undertook to investigate the moral character of factory-girls in the community which paid him for his labors. Journeying to a certain manufacturing town, instead of betaking himself to the chief-of-police or the physicians, who could between them have given him a pretty clear idea of what he wanted to know, he asked, apparently, the first two men that he met, what was the moral character of the factory-girls of the town. The first man answered promptly that they were no better than prostitutes. The second replied that they were just as good as any other young girls, and the statistician retired with these two pieces of information to add them together and divide by two, and tabulate the result as the moral condition of the gentler sex in the fourth or fifth city of the State.

AN official of a similar stripe has been composing some disquisitions upon "Boy and Girl Labor" in another State, based, apparently, upon his reading of the advertisements in the New York *Herald*. In this journal he finds a large number of advertisements for boys, or for young men not over twenty-one or so, while comparatively few advertisers express their preference for old men, and he argues from this circumstance that an "appalling" competition for employment exists between the boys and their seniors. As "two or three half-fledged apprentice-boys will affect the living and wages of a skilled mechanic," the "skilled mechanic," unless he has sons of his own whose future he wishes provided for, tries to prevent their employment, and in consequence of this, as we think, rather than of the "want of aptitude" with which the commissioner reproaches the apprentices, they "go knocking about from one place to another," and finally, in many cases, get knocked out of the State altogether, "wandering wherever they hear of a chance to pick up a living." It would be interesting to know what the commissioner would recommend as a method of disposing of young men of twenty-one, to prevent their "appalling" influence upon the fortunes of the older men who want to keep all the work and wages to themselves. No doubt it would be delightful to have them all sent to college and kept there until the plumbers considered them of suitable age to begin learning a trade, but there would be bills to pay in this case, and the commissioner points out no means for meeting these and for supporting the younger brothers and sisters meanwhile. In fact, the whole essay, which the State pays for having written, printed and bound, appears to be a sort of rambling, purposeless discourse, inspired, if it could be said to have any inspiration, by the newspaper accounts of the effort of the plumbers last year to prevent boys from learning their trade, illustrated by some feeble inferences from newspaper advertisements, and confused with a dozen other matters, among others, with the prevalence of "single women" in the large cities, which the commissioner attributes to the employment of boys in stores and factories. It is sad that public money should be wasted on such trash as this, but for the moment all politicians stand in mortal terror of Labor, with a capital L, and seem to be ready to vote for any appropriation the title of which contains the magic word.

THE great competition for the rebuilding of the front of Milan Cathedral has been brought to a close by the selection of the design of Ferdinand Becker of Mayence. Taken altogether, this seems to have been one of the most interesting competitions of recent years. A great deal of latitude was allowed to the designers, and all facilities were afforded themf or studying the history and style of the building which they proposed to improve; while, last, but most important of all, the decision was entrusted to a jury of the most distinguished experts in Europe. This assurance of an intelligent judgment seems to have proved a great attraction to architects, and one hundred and fifty designs were submitted, by one hundred and thirty competitors, many sending alternative plans. The most extraordinary diversity, as we learn from the foreign journals, existed among the plans. It is hardly necessary to say that nearly all the designers proposed to complete the purely Gothic building by a façade in the same style; but one architect attracted attention by an attempt, which was not without considerable success, to exalt the present commonplace Renaissance front into a portion of a very noble composition, by building beside it a splendid Renaissance campanile. As a rule, all the designs, whether in Classic or Gothic style, comprised towers of some sort. One plan proposed to give dignity to the front by accenting it with two spires, each nearly seven hundred feet high; while another showed no less than nine towers of various dimensions. The preliminary selection included plans by English, French and German, as well as Italian architects, and curiously enough, the final choice fell upon an architect belonging to a town which is almost destitute of examples of good Gothic architecture, although it possesses one of the most beautiful buildings in the world, in its German Romanesque cathedral. We are sorry to have to add that the Milanese architects, or at least a considerable party of them, bore with anything but a good grace the decision which gave the palm of victory in an honestly managed, and well-fought contest, to a foreigner. Immediately after the award a rather excited meeting was held, in which the hastiness of the decision was denounced, and a demand was made upon the Royal Commissioner of Public Works to annul the work of the jury. It is not at all likely that the Commissioner will do anything of the kind, least of all on the pretext that too hasty a judgment was given upon plans which the local members, in Milan, who formed a large part of the jury, had for months had before their eyes; but the affair gives an unpleasant turn to what would otherwise have been an interesting chapter in the history of art, and we hope that the good feeling of the other Italian architects, who need not fear comparison with those of any country in the world, will lead to a prompt repudiation of the action of a disappointed faction.

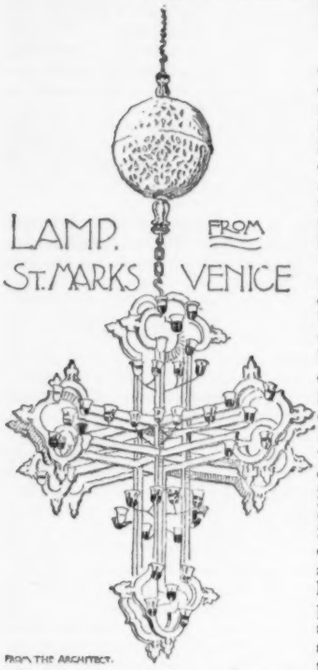
WE do not doubt that we have many sympathizers in our ill-will toward the samples of tin, stamped and guaranteed in a somewhat ferocious rivalry, which come to us through the mails with irritating frequency. Having already studied the stories of the contending manufacturers, we do not feel that we should be further enlightened by renewed inspection of the bits of metal, and as these cannot be burned up, and are rejected by the paper-stock collector, they accumulate, taking up room which few offices can afford to spare them. If one had time, however, to compare these specimens of the best modern tin-plate with sheets ten or twenty years old, the difference in quality would strike the most careless observer. Most

of us remember the tin-plate of our youth, with its surface diversified at one end with drops and streaks, where the bright coating solidified in the act of dripping off, and can understand the imperfections of such a product as compared with the smooth, uniform sheets of the present day, rolled between polished rollers after undergoing their bath of tin, and showing a surface nearly as finished as a mirror; but the greatest improvement ever made in the manufacture is perhaps the less obvious one introduced about seven years ago, when the soft open-hearth steel was generally substituted for Swedish iron in making the plates. The modern methods of working tin, by stamping in place of soldering pieces together, demand plates of the utmost ductility, and the Siemens-Martin steel, while easily and cheaply produced, not only equalled the pure Swedish iron in this respect, but gave sheets which were, with an equal weight, both stronger and smoother than those of iron, requiring, for a given purpose, less iron and less tin than the old plates. Within a short time, the Thomas-Gilchrist steel, made by a process similar to the Bessemer conversion, has been substituted for the open-hearth steel; but the value of this change is not yet entirely settled. Of iron and steel of all kinds, according to the *Revue des Mines*, the tin-plate makers of England now consume four hundred and sixty thousand tons a year. At a rough calculation, this would be enough to roof over a shed extending from New York to Liverpool, and wide enough for the "*Etruria*" and the "*Umbria*" to pass each other at any point, with room to spare; but it seems that a very large part, instead of being used for roofing, which is an exclusively American method of employing the material, is consumed in making cans for preserving meats, fruits and vegetables. Of these the number turned out is so enormous as to be almost beyond belief. In 1885 eight hundred and seventy-five millions are known to have been made, and there may have been millions more, which escaped counting. Next to the reflection as to what all these contained, the most interesting inquiry which this piece of statistics suggests is what becomes of all the empty cans. Millions of them are thrown into the sea, and sink, or are cast on desert shores; and millions more find their way to the rubbish heaps which fill low lands and excavations, but there are still myriads unaccounted for. In Egypt, it is said that the Arabs pick up the large rectangular cans in which coal oil is exported to them, fill them with sand, and build very comfortable houses with them, but the cylindrical can does not lend itself very well to architectural purposes, and the world still awaits the inventor who shall tell it how to utilize to advantage the cast-off evidence of modern civilization.

LA SEMAINE DES CONSTRUCTEURS, in reply to a correspondent who asked for the recipe of a cement for repairing the worn places in stone steps, gives the composition of the famous "*ciment Sorel*," which has for many years been used by a few contractors, who make a great secret of their process, for filling cavities and restoring abrasions in stone or marble. The first person to use the cement, Sorel, was the inventor of the so-called process of "galvanizing" iron, by covering it with a protecting film of zinc. In the course of his experiments he found that the oxide of zinc, mixed with a solution of the chloride of the same metal, gave a substance which soon became in air as hard as marble; and with slight variations, this mixture is the one employed by all his successors. Sorel, in practice, either used the washed residues from the manufactories of zinc white, which are perhaps heavier and less pure than the white pigment, or heated the ordinary zinc white of commerce to redness to increase its density, upon which the hardness of the cement depends. This, when intended for use, he mixed with a rather concentrated solution of chloride of zinc, having a density of fifty to sixty degrees by Beaume's hydrometer, usually adding about three per cent of borax or sal-ammoniac to lessen the rapidity of setting. So prepared, the "*ciment Sorel*," after setting, soon becomes as hard as marble. It adheres very strongly to stone, and resists heat, cold, moisture, and even the action of acids, and may be colored. To reduce the cost, and assimilate it to stone, powdered granite, marble or hard limestone may be mixed with it, but soft earthy substances should not be used. As at present manufactured in Paris, various additions are made to the powdered zinc oxide, to give certain colors or textures, and the chloride solution is sent separately in bottles, the price of the whole, ready for mixing, being about seven cents a pound. The basis of the cement is in all cases the same, some trifling differences in the mode of preparation, such as washing the zinc white with water containing borax before calcining it, or using protochloride of iron, or chlorohydric acid, in the solution, in place of zinc chloride, serving mainly to support the claims of particular manufacturers to a special method of fabrication. In general, the heavier the zinc oxide, and the more concentrated the chloride, the stronger is the cement. To repair stone, either in the shape of statues or steps, the portion to be operated upon should first be scraped to a fresh, clean surface, and then moistened with the liquid chloride. A sufficient quantity of the dry cement is mixed with enough liquid to form a stiff paste, and placed in position, and after being allowed to set a few days, is trimmed off, and smoothed by rubbing with a piece of stone. In summer, it will become hard enough to rub down in two days; in winter five or six days are necessary. While setting it must be protected from rain, and two weeks should elapse before a staircase repaired with it is opened to general use. Some of our readers, whose recollections of their experiences in the dentist's chair are fresh, will probably be struck by the similarity of the operations described to those which the dentist goes through in repairing a large cavity with cement filling, and in fact the cement used by dentists is nothing else than the "*ciment Sorel*," prepared with care for their purposes.

TWO rather remarkable discoveries are said to have been made recently of objects belonging to the most ancient period of Greek, or, perhaps we ought to say, of Pelasgic art. In one case a Turkish dervish, living at Bournabaki, near what Dr. Schliemann supposes to have been the site of ancient Troy, opened a stone tomb, and found in it a gold crown, of heavy, foliated design, a girdle, three inches wide, with a clasp, all of solid gold, and two golden rods or sceptres. Independent of their archæological value, the weight of metal contained in the different pieces is sufficient to make the finder a comparatively rich man, and all the tombs in the neighborhood will probably be ransacked without delay. Judging from this treasure, which dates, apparently, from the period before the Trojan war, the Pelasgic inhabitants of the eastern coast of the Mediterranean must have been a rich and luxurious people; and many other evidences tend to show the same thing. To say nothing of the multitudes of gold ornaments found by Dr. Schliemann at Mycenæ, explorations in other places connected with what used to be called the mythical history of Greece have been fruitful in rich discoveries. Not long ago a tomb, belonging, apparently, to the prehistoric, or Homeric period, was opened at Dymenion, near Volo, in Thessaly, far from the seat of the Pelasgic power in Argolis, and in it was found what is said to have been a countless number of objects, mostly ornaments for women, and in great part of gold. The patterns of the ornaments, of which there were many hundreds, were mostly suggested by leaf and flower form, and closely resembled in style those found by Schliemann at Mycenæ; but, besides the objects of simple wrought gold, many were found set with pearls and precious stones. Each of these discoveries, which now follow each other rapidly, must certainly increase the curiosity of archæologists to know more of that strange race which once filled Asia Minor, and apparently all Southern Europe, with its wealth and industry, and then disappeared by what all tradition asserts to have been a series of manifestations of superhuman agency. If we had simply to think of the people of Argolis and Troas as an ingenious, industrious, common-place race, like ourselves, we should be interested in their history, but nothing more; but what we are told about them gives them the character of having been on the most familiar terms with supernatural beings. One of them, who, if all the history we know about him is true, probably wore some of the ornaments dug up by Dr. Schliemann at Mycenæ, served up one of his relatives at a dinner-party, thereby incurring the anger of a divine guest; another, in the last years of Pelasgic prosperity, was appointed judge in a contest of beauty among the three principal goddesses, and a third, travelling about the world after the extinction of the power and industry of his race, was invited to a banquet by a lady, who, resenting the imperfect table-manners of his suite, turned them all into pigs by a wave of her hand. So long as no actual trace was known to exist of these personages, the legends had hardly more than an artistic interest; but after finding the remains of Agamemnon, the great-grand-son of Jupiter, covered with the ashes of the palace in which he, together with Cassandra, the beloved of Apollo, was murdered by Clytemnestra, the niece of the Swan, one is brought pretty close to the gods and heroes, and it is impossible not to desire a clearer view.

NOTES OF TRAVEL. — BUFFALO.



FROM THE ARCHITECT.

WITH many people Buffalo is thought of as pertaining to that vast, indefinite portion of the country comprehensively designated as "the West," a term implying a certain amount of breezy individuality and an unlimited quantity of pluck, enterprise and ambition. But Buffalo is really no more in the West than is our own city of Boston, for do we not speak of going "down East" when contemplating a journey to Portland or Nova Scotia? The line between East and West, Detroit people tell us, lies just beyond their city, while Chicago is very emphatic in claiming Eastern attributes, and so on across the entire continent East and West are doubtful terms, until even in San Francisco, a man will speak of "going West." But if Buffalo belongs to the East by virtue of its geographical position, it is even more Eastern in its appearance; not that it is lacking in energy or enterprise, but somehow it has to a stranger a quieter, more substantial, less commercial air than one might expect. An over-abundance of large comfortable dwellings, a minimum of wooden shanties, and an amount of business which seems so exceedingly small by comparison with the really large population that one is led to speculate as to where the people get the money to build so many fine houses when they have so few business-blocks of any importance. And again, the well-kept streets, the neatly-planted gardens with which most of the houses are surrounded, the apparent absence of the handiwork of the speculative builder which has been such a blot on the beauty of more westerly cities, and the close lines of thick, green foliage embowering nearly every street, all combine with the bright sunshine and the fresh, clear atmosphere to give Buffalo an appearance not unlike that of New Haven. It goes without saying, that Buffalo is a pretty city, and this too, notwithstanding the fact that, as with so many of our American cities, both East and West, the natural advantages of site have been quite neglected, the finest streets being away from the lake, and the water-front being so little esteemed that we doubt if one stranger in ten would ever appreciate from any ocular demonstration that Buffalo is situated on Lake Erie.

The commercial architecture of Buffalo is commonplace when it is not hopelessly bad, and, with a very few exceptions, only excites a vague wonder why the very presence of such work is not enough to prevent the erection of any more of the kind, for, notwithstanding the old proverb about the lessons which experience teaches to all but the simplest-minded, the new work is quite as bad, if not worse, than the old. There is a good street-front, No. 290 Main Street, a single arched opening in brown sandstone extended through two stories, crowned by a high billeted cornice and filled-in with a sober-toned copper bay; a front of very modest dimensions, but broad in its treatment, and worthy of better surroundings. The only drawback is that it is built over a wide, cavernous show-window—perched, as it were, upon a huge sheet of plate glass, practical considerations having demanded that entire absence of apparent support which is such a hopeless feature of the typical street-front. Then there is a good front in moulded brick just completed on Seneca Street near the railroad station, but these and a few others of the kind are exceptions, most of the commercial architecture being quite uninteresting.

The same cannot be said, however, of the public buildings. The City-Hall, while not a structure of decided originality, is a simple, dignified design, pleasing if only from its quiet mass. The details are, perhaps, neither well-chosen nor intrinsically good, but they are unobtrusive as the building is usually seen from across the square, and with its picturesquely-grouped turrets and chimneys, it strongly recalls a delightful old town-hall and belfrey in the quaint Belgian city of Courtrai, which has been sketched and admired by so many generations of architectural wanderers. It is built of stone, a gray granite if we remember aright, and thus has an added value, for try as we will, brick can never have such a dignified, monumental appearance as honest stonework. But that brick can still be used to advantage in even a large public building is abundantly shown in Buffalo by the example of the Public Library building, recently built after the design of Mr. Eidlitz, of New York. It occupies the best site in the city, an irregularly-shaped lot facing the principal square. It is built entirely of brick and terra-cotta of a uniform dark cherry color, the more striking in effect, as the square in front of it is one of the few spots in Buffalo where foliage is not abundant, so that the Library building stands out in very vivid color under the glare of the sunlight. The design is Romanesque, or Norman perhaps more properly, in general design, with enriched round arches, foliated belt-courses and cornices, and a general profusion of detail which would seem over-done were the design executed in stone; but somehow when terra-cotta is used we expect more freedom, a greater "swing" in detail and richer lines than would be admissible in any other material, and especially when, as in this instance, the entire design is in a single color, from ridge-cresting to water-table, it will stand an almost indefinite quantity of moulded ornament. The building is perhaps not monumental in the truest meaning of the expression, but it is delightfully picturesque in form and detail, and is a refreshing contrast to some of the structures which surround it, while internally it is one of the pleasantest, most convenient combinations of library and reading-room it has ever been our pleasure to visit.

Space would forbid more than a mention of a few of the other successful buildings of Buffalo. There is an excellent structure just completed for the German Young Men's Association on Main Street, by Mr. Richard Waite, of Buffalo; a few good church spires; and in the suburbs a Crematorium, by Green & Wicks, which has been illustrated in some of the architectural papers; also, a large asylum erected from the designs of Mr. H. H. Richardson; but the most interesting, if not the best development of the local architecture, is found in the private dwellings. The people of Buffalo have always taken a pride in their homes, if we may judge by appearances, for even the older houses, erected at a period when architecture was hardly good building, are, as a rule, pleasant, comfortable, and quite free from the questionable taste which marks the commercial architecture of the city.

The Buffalo architects have adopted one usage which is not entirely unknown about Boston, though there seems to be a feeling here that it is not practicable. Every one knows how troublesome it is to satisfactorily arrange the corner-boards of a clapboarded house. A regular pilaster finish, such as looks so well with a colonial design is not always desirable or possible, and an ordinary corner-board is apt to unpleasantly mark the angles of the house just where the architect would wish to keep them as unobtrusive as possible. In much of the more recent Buffalo work this difficulty is obviated by simply omitting the corner-boards entirely. The corner is flashed with zinc against the boarding and the clapboards are run out to the edge and mitered, or cross-lapped like shingles. In either case, the corner is perfectly tight against the weather. There is a house on North Street, just beyond Delaware Avenue, which well illustrates this usage, and is besides so successful in its color that it is worth while to notice it a little in detail. The lower story is in a rather dark red brick. The second story is clapboarded and portions of the gables are shingled, both surfaces being stained a rich, warm brown. The upper portion of the front gable is filled with rough plaster, stuck over with bits of opaque glass, and left a light gray tone. The roof is covered with blue slate. The outside finish is painted a dull Venetian red in the lower story, the architraves, etc., above being a very dark green, the sashes red, and the inside blinds white. The general effect is charming, just enough brightness about the windows to relieve the general sober colors, and with only the difference in texture between clapboards and shingles to mark the two upper stories.

Dark tones for house-painting seem to be the rule in Buffalo, and the white and yellow combination so dear to the colonial builders would stare itself out of countenance by contrast with its sober neighbors. Most of the houses along North Street, Linwood and Delaware Avenues, when not built of masonry, are stained and painted to a depth of tone which would be overpowering were it not that all the lots are quite wide, so that the houses stand entirely detached, with plenty of air and sunshine all about them, so that even without the added abundance of tone in the shape of foliage, the dark colors would hardly seem misplaced. Two examples will illustrate the scheme of color which seems most in favor. No. 390 Linwood Avenue is a large, hospitable-looking house, built of common brick in the lower story, with no architectural features except a few round arches. The walls above are shingled and stained a strong Van Dyck brown, with a little rough-cast work in the gable. The roof is stained a clear Indian red. Opposite this, No. 405 is much the same description of house — pressed-brick lower story, shingled walls and roof of a strong umber tone, a wide bay below, and a single, broad, overhanging gable. Both these houses are types, and are very good in mass, quiet and satisfactory in effect, and in thorough good taste. All the new houses are not equally good. The bad is mingled with the good quite as effectually in Buffalo as anywhere else, but on the whole, though the business blocks are so hopelessly commonplace, the balance is more than made up by the average excellence of the domestic work, and the Buffalo people may well feel a pride in their beautiful city and in the new work their architects are producing.

DECENNIAL INDEX OF ILLUSTRATIONS. — We have in course of preparation a classified index of the illustrations published in the *American Architect* from 1876 to 1885 inclusive. We find that in very many cases the *cost* of the building has not been stated, and we therefore, ask our contributors to furnish us the approximate cost of such buildings of their designing as have been published during the above-named years.

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF J. G. MITCHELL, ESQ., BROOKLINE, MASS. MESSRS. CABOT & CHANDLER, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial Edition.]

HOUSE OF G. H. DUNBAR, ESQ., BUFFALO, N. Y. MR. E. A. KENT, ARCHITECT, BUFFALO, N. Y.

BROWN-STONE in snake joint; shingle second story; oak finish and floors; Durham drainage; entire stairway carved; cost $14,000.

NATIONAL MONUMENTS, II. — THE DOM PEDRO COLUMN, LISBON, PORTUGAL. M. DAVIOUD, ARCHITECT; THE CARLISLE COLUMN, CARLISLE, ENGLAND. PROFESSOR COCKERELL, ARCHITECT; THE VENDOME COLUMN, PARIS. MM. LEPERE AND GONDOIN, ARCHITECTS; COLUMN OF JULY, PARIS. MM. ALAVOINE AND L. J. DUC, ARCHITECTS; COLUMN OF THE PLACE DU CHATELET, PARIS. M. BRASLE, ARCHITECT; THE CONGRESS COLUMN, BRUSSELS, BELGIUM. MM. GEERS, SCULPTORS; THE COLUMN FORMERLY AT BOULOGNE, FRANCE. M. DE LA BARRE, ARCHITECT; THE WASHINGTON MONUMENT, BALTIMORE, MD. MR. ROBERT MILLS, ARCHITECT.

SKETCHES AT BUFFALO, N. Y. BY MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

THE PALACIO POLENTINOS, AVILA, SPAIN.

EXHIBITION OF BUILDING MATERIALS AT THE BRUSSELS BOURSE.

STATUE
CHURCH OF ST NICOLAS DE PORT

THE Belgian Society of Engineers and Manufacturers, which sprang out of the Railway Jubilee of 1885, has not been idle during the first two years of its existence. Already has it held five special exhibitions, viz.: of M. De Lesseps's plans and models of the Suez and Panama canals; of metallic permanent way for railways; means of illumination, from the rush-light to the electric-lamp; India rubber and its applications; and telephonic apparatus. The sixth exhibition, which is now open to the public on payment of a small admission fee, is devoted to all constructive materials, except the metals; besides the usual run of bricks and tiles, natural and artificial stone, lime, cement and colors, there are a few exhibits of exceptional interest that merit a word or two of special notice.

Very interesting objects are the millstone and *pierre à concasser* or stone for crushing, hewn by the Romans out of the Landenian (Silurian) sandstone, a formation extending over a large portion of Belgium, the stratum of sandstone which it contains varying from 0.20 metres (eight inches) to five metres (sixteen feet.) The Romans made mill-stones of this rock, as proved by the specimen exhibited, which was found near Louvain; but, although the stone has been worked subsequently for various purposes, it does not appear to serve now for any other use than paving-setts. The stone for crushing, carefully fashioned with ears for holding it out of the same rock, was found in the quaternary clay near Tirlemont at a depth of six metres.

The principal building stone of Belgium is the "*pierre bleu*" or "*petit granit*" which occurs in the southern portion of the kingdom. It is not a granite, but a limestone of very fine texture, easily wrought, and capable of taking a high polish, when it appears almost black. Various objects exhibited, such as finials, show that this stone lends itself readily to artistic decorations. When used for quoins, window-sills and enrichments in the old Flemish houses, this stone forms a pleasing contrast to the dark, dull red bricks of the country; and for such a purpose it is most suitable. But it is, unfortunately, much used also for the flags and curbings of footways, and for this purpose it is most unsuitable. Owing to its soft nature, this stone wears away, often unevenly, leaving large hollows which hold the water, and wearing quite smooth, so as to be very slippery in wet weather. There are some curves in the tortuous Montagne de la Cour, the principal street of Brussels, connecting the upper and lower towns, where the side of the curb has been half worn away by the carriage-wheels, as proved by the iron clamps connecting two lengths, which originally placed in the middle, are now on the outside.

A far better footway, for dryness, appearance and the prevention of slipping, is formed by what are called "*platines*" or the finer variety of porphyry setts, cubes of three or four inches square, laid either parallel with the curb or diagonally, when they present a very neat appearance, the larger and rougher setts forming capital roadways. The principal porphyry quarry in Belgium is that of Quenast, which is one hundred hectares or three hundred and seventy acres in extent, and produces one hundred thousand paving-setts a day, which are exported to many European countries. An excursion to this celebrated quarry has been arranged by the Belgian Society of Engineers in connection with the present exhibition.

The beautiful Belgian marbles are also largely exported, and are well represented at the exhibition. They may be classed generally under two varieties, the red and the black, among the former of which the *Rouge Royale* is the best known. The black variety with white streaks of greater or less prominence, deserves, however, to be more used. Among the latter, the *Grand Antique Belge*, the *Sainte Anne*, and the *Couquilié* or Shelly, merit special recommendation. Here it may be mentioned that the Belgian *cheminée* or mantel-piece is a much more elaborate affair than the British, being returned at the sides of the chimney-breast, while the uprights are often set diagonally, and the slab is often gracefully curved. Some of the specimens of the leading varieties of Belgian marbles, prepared like subjects for the microscope, to demonstrate the origin of the Devonian and Carboniferous limestones, have been sent by the director of the Brussels Natural History Museum. They are ground down to one-tenth of a millimetre or 0.0039″, being stuck down between two glass plates, and are mounted in vertical frames, so that their structure may be seen, and also examined by a magnifying glass, on looking through them against the light.

Some specimens of artificial marble are contributed by Bruno & Co. so true to nature that they can only be detected by the absence of those fine clay veins which somewhat detract from the appearance of real marble, and also lead in time to its disintegration. This substance is produced at from four francs to eight francs — that is to say less than one to two dollars — per square metre, while some excellent marble mosaic is laid by Souffler-Leblond for twelve to twenty-five francs — five dollars — per square metre.

M. Dassonville de Saint Hubert makes improved Portland cement, under license from R. Boase and F. Wolters, into the composition of which blast-furnace slag largely enters. It is ground so fine that a sieve of five thousand meshes to the square centimetre, 0.155 inch, will only intercept ten per cent, and one of one hundred and eighty meshes one per cent. In a series of tests carried out by German Government engineers, this cement mixed with three parts of sand showed a resistance to tensile strain of 244.6 pounds per square inch after seven days, and of three hundred and thirty pounds after twenty-eight days, setting. Picha Frères, of Ghent, make various articles, such as the basins of fountains, tanks and troughs, of cement with an iron wire foundation inside to increase the strength. Renette & Co., of Louvain, sink wells in loose sandy soil by means of their concrete rings, which fit one into the other with a socket-joint, the interior being plain and smooth. The surface of the ground is first levelled, and the bottom ring, which has a bluntly bevelled and somewhat splayed-out edge, is laid upon it. The earth inside is then excavated, and the ring sinks through its own weight. When its top is nearly flush with the surface, another ring is added, the joint being cemented, and the excavation is continued, and so on until water is reached. In this way, accidents due to the earth's falling-in are avoided, and contaminated surface-water is intercepted.

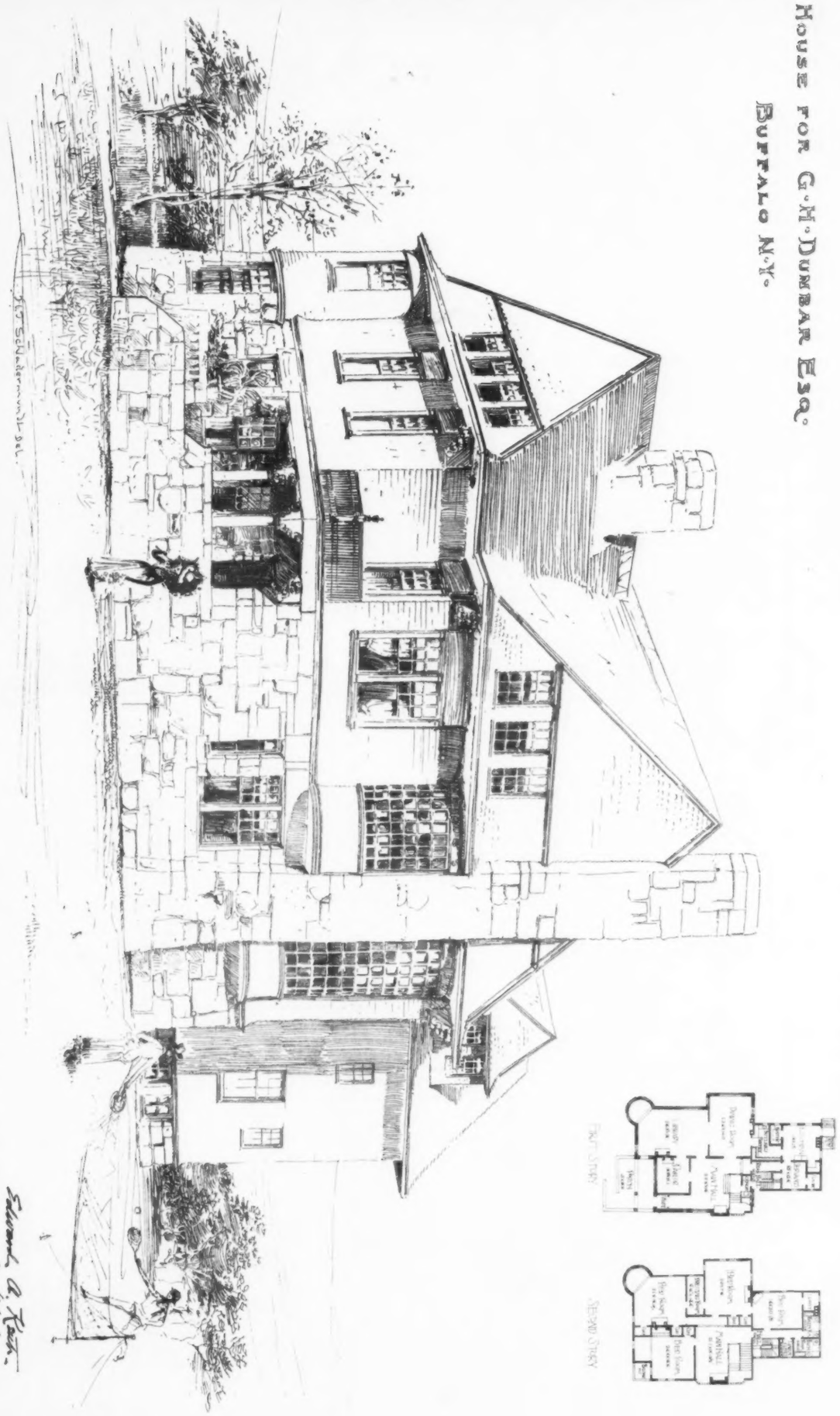
Several makers show bricks, hollowed out, some longitudinally and others transversely, in accordance with their external form, but always having feathers left in the middle for strength. Léon Champagne & Co. make what they call *voussoirs*, or hollow bricks approaching the wedge shape, for turning flat arches over the space between rolled-iron joists, and thus making a fireproof floor. The Société Anonyme des Deux Mèthes accomplishes the same object by a similer use of hourdis, or long and wide slabs, made of clay like the hollow bricks. Again, L. Vaillant, of Brussells, makes somewhat similar slabs of plaster-of-Paris, for the some purpose, the rounded edge of one fitted into the hollow edge of the other. Similar but solid slabs of plaster are made by the Société Anonyme des Fours de Laeken for forming light fire-proof party-walls, with the object of dividing a large room, for instance, when there is no wall below.

The two firms of Dammon & Cassard and Tasson & Washer have long been favorably known for their parquet flooring, and send men to lay them in the various countries in Europe. These firms are now united under the style of Dammon et Washer, who exhibit some inlaid panelling, in which the joint between the several woods is represented by a mere line, so excellent is the workmanship. A specimen

COPYRIGHT 1887 BY TICKNOR & Co

HOUSE FOR G. M. DUMBAR ESQ.

BUFFALO N.Y.



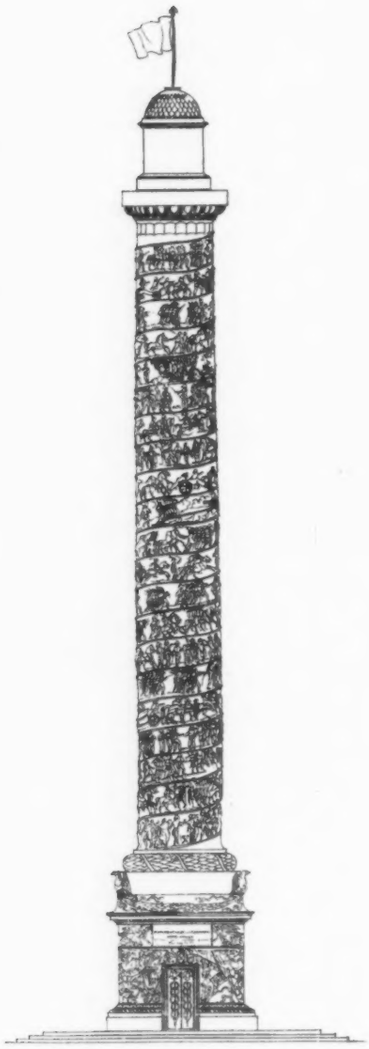
Edward A. Kent
Architect
Boston

Phototype Printing Co. Boston

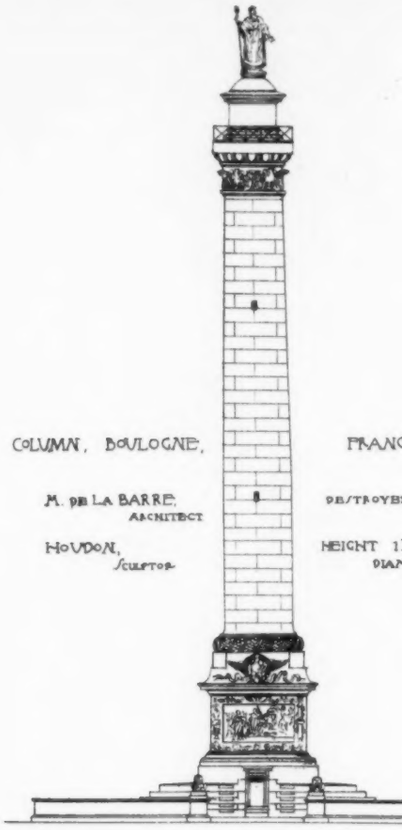
COPYRIGHT 1887 BY TICKNOR & CO

COLUMN TO
DON PEDRO IV. LISBON, SPAIN.

DAVIOUD,
ARCHITECT



VENDOME COLUMN,
PARIS.
HEIGHT 133 FT. DIAM. 12 FT.
ORIGINALLY SURMOUNTED
BY A STATUE OF NAPOLEON



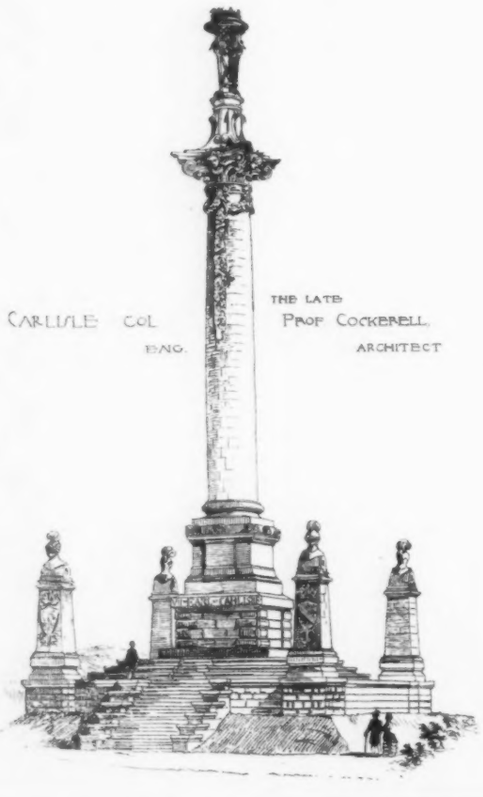
COLUMN, BOULOGNE, FRANC

M. DE LA BARRE,
ARCHITECT

HOUDON,
SCULPTOR

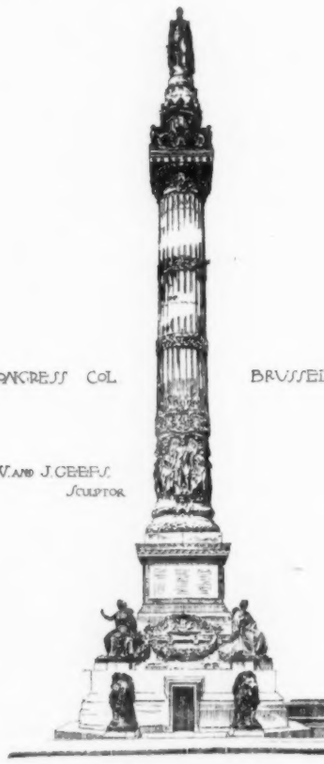
DE TROYE

HEIGHT 1
DIAM



CARLISLE COL.
ENG.

THE LATE
PROF COCKERELL,
ARCHITECT



CONGRESS COL. BRUSSEL

W. AND J. GEEFS,
SCULPTOR

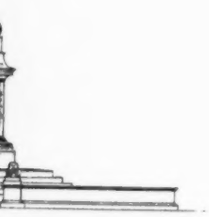
NATIONAL MON

ANDE & CO

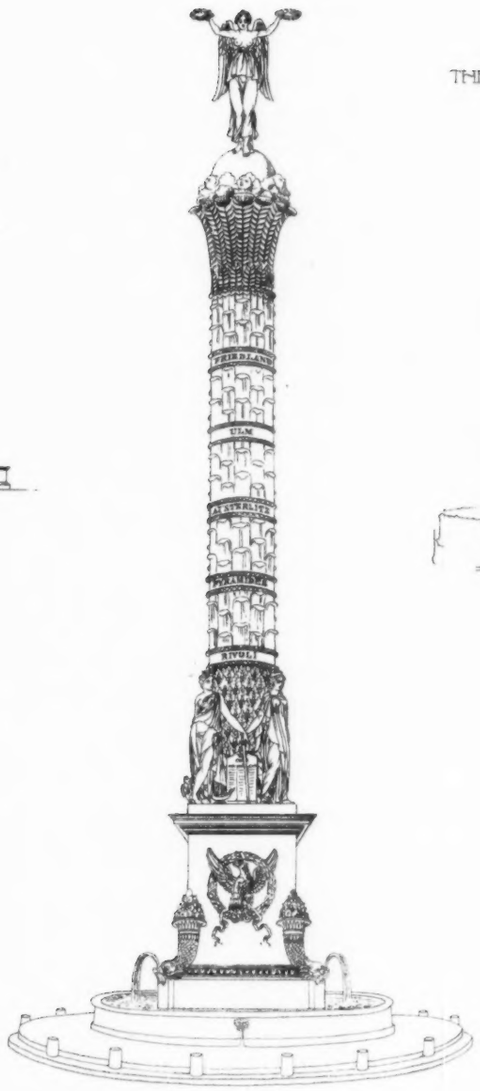
FRANCE

DESTROYED 1815

HEIGHT 132 FT.
DIAM. 12 FT.



BRUSSELS.

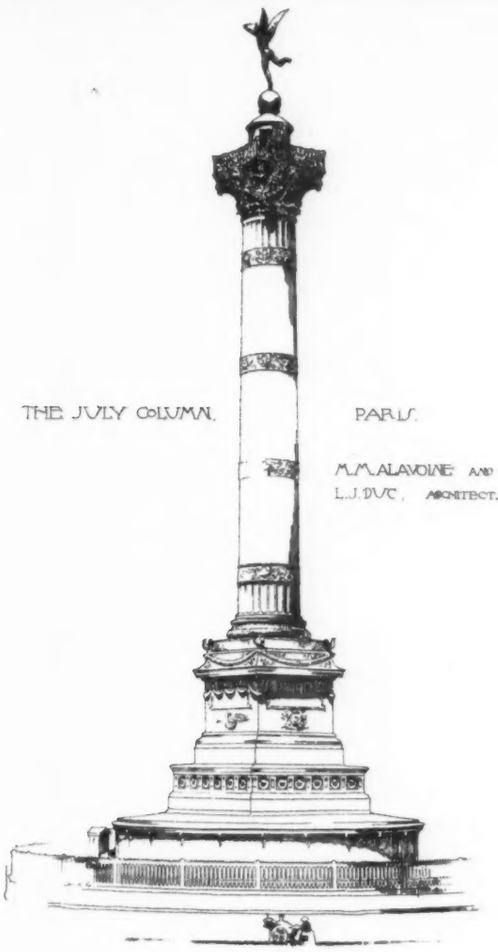


FOUNTAIN PLACE DU CHATELET
PARIS

M. BRAULE,
ARCHITECT.

THE JULY COLUMN. PARIS.

M.M. ALAVOINE AND
L.J. DUC, ARCHITECTS.

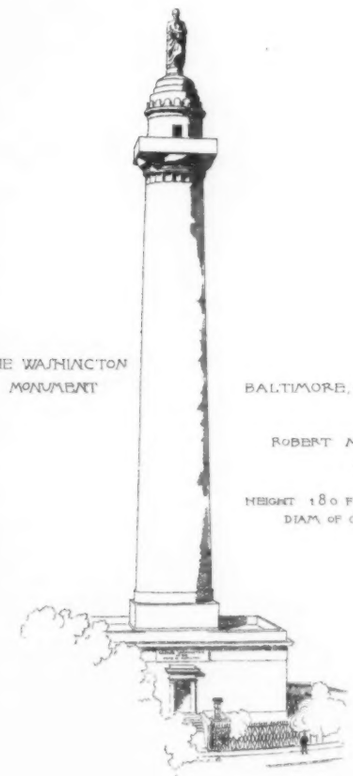


THE WASHINGTON
MONUMENT

BALTIMORE, MD.

ROBERT MILLS,
ARCHITECT.

HEIGHT 180 FT.
DIAM. OF COL. 20 FT.

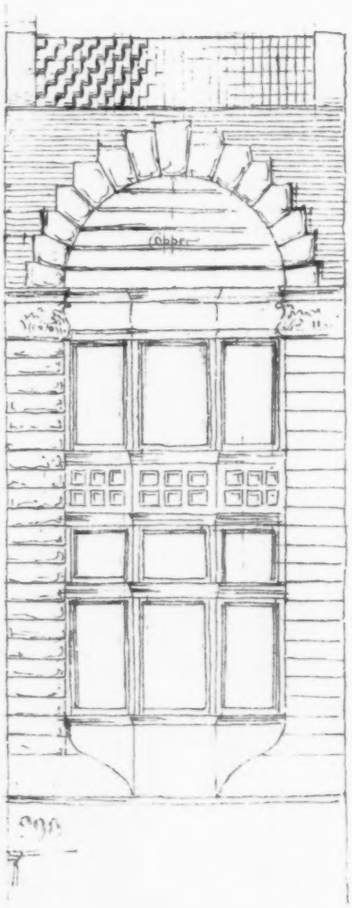


MONUMENTS

Heliotype Printing Co. Boston.

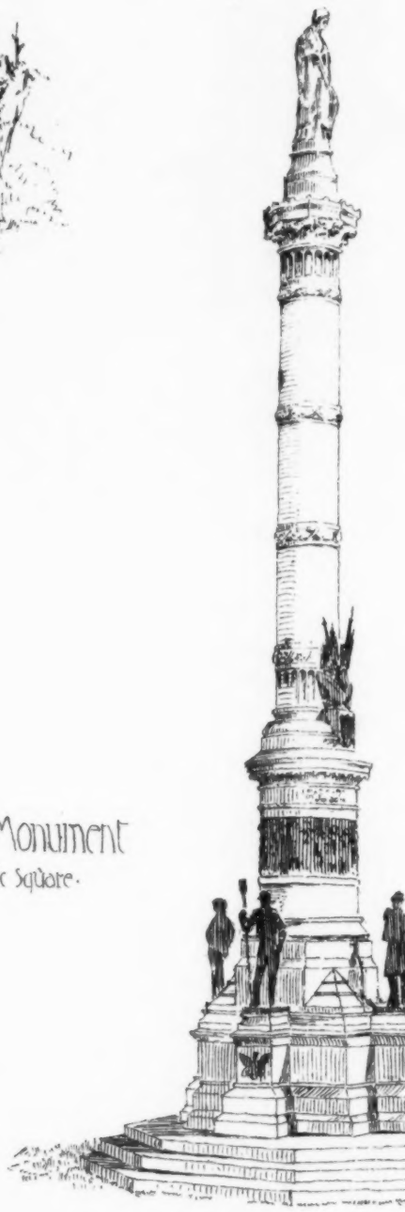
COPYRIGHT 1887 BY TICKNOR & CO

By Green & Wicks -



Building on Main St.

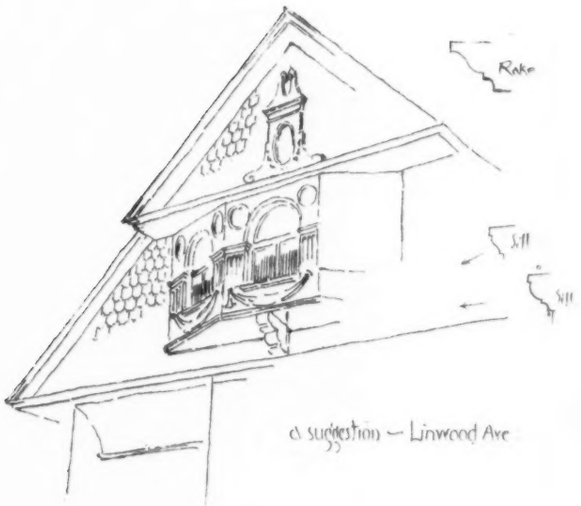
from memory



Soldiers' Monument
in Public Square.

TICHNOR & CO

A House by Green & Wicks

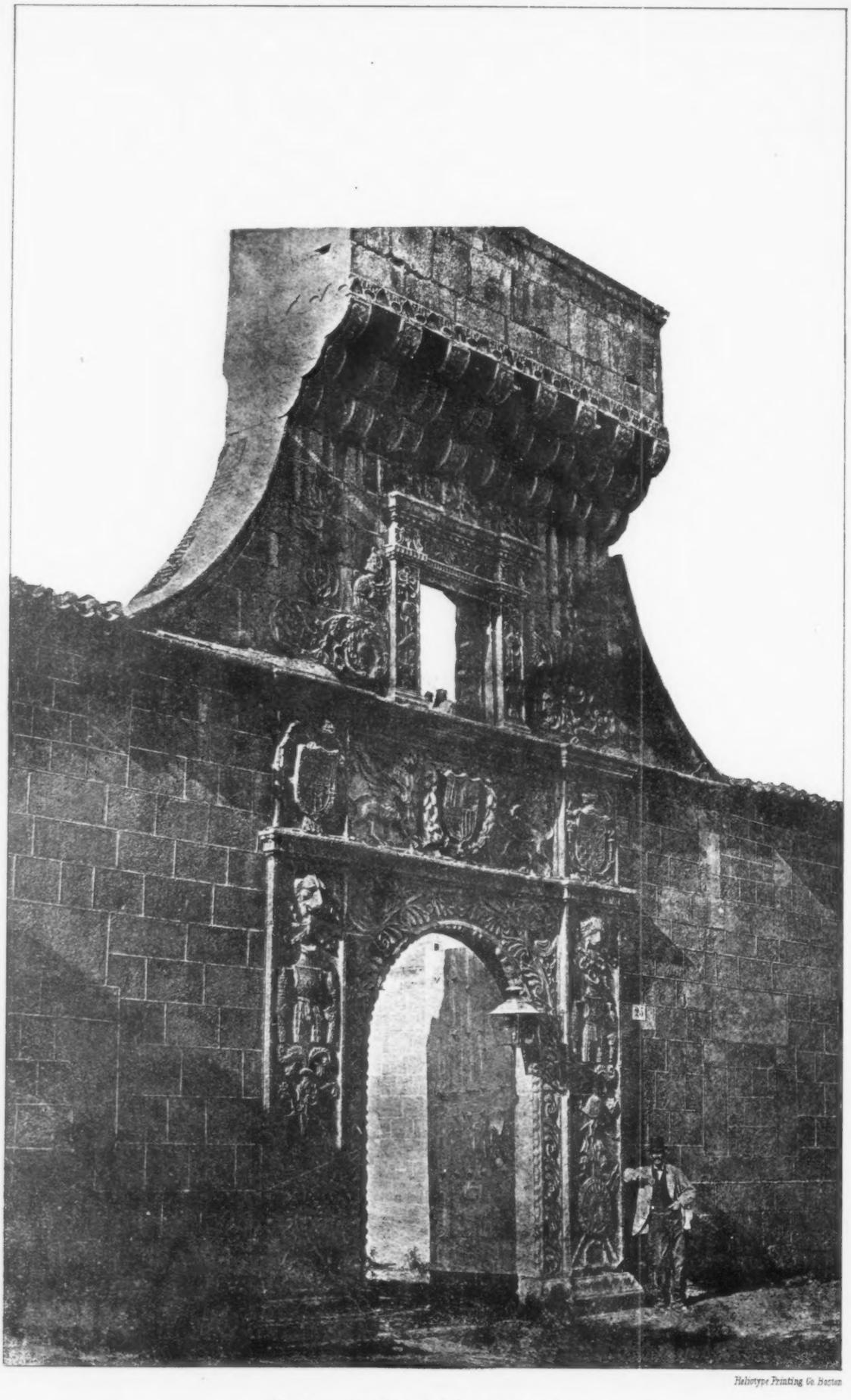


~Sketches from Buffalo · N.Y.~

by C.H. Blackall.

Heliotype Printing Co. Boston

COPYRIGHT 1887 BY TICKNOR & Co



Heliotype Printing Co. Boston

Palacio Polentinos. Avila.

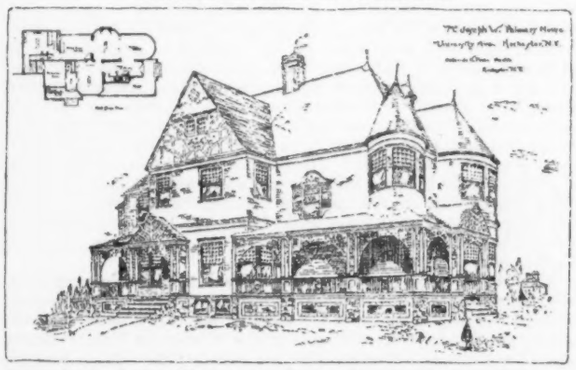
is exhibited showing the construction of a capital floor that is laid down at the Brussels Hôtel de Ville, the Palais de Justice and the newly completed Palais de la Nation. On slight flat arches, or directly on the ground, are laid tiles with conical holes in the centre of each. Over these is spread a layer of hot asphalt or bitumen, which enters the holes and also the internal dovetails made half in each long-ways edge of the pieces of parquet flooring, laid while the asphalt is still hot, so that on cooling it forms a key between the tiles and the parquet floor, making all solid together. Such a floor is noiseless, sound-proof, damp-proof and practically fire-proof. A stronger and more fireproof modification of the above is made by turning shallow arches in concrete between light rolled joists, leaving internal dovetails in the upper surface of the concrete. Liquid asphalt is poured over this; and while it is still hot, parquet pieces with dovetails as above described are bedded therein.

It must be confessed that so-called asphalted or bitumenized felts for roofs have not hitherto given very good results. The layer of gas-tar or what-not is soon melted in a hot sun; and the unprotected felt then becomes disintegrated very speedily. M. Em. Pierret, of Vilvorde, claims to have changed all that with his inalterable roofing cloth, which he sells for a franc to the square metre, offering to lay it in Belgium for less than half the amount in addition. A coarse flaken tissue is impregnated and coated with a substance consisting chiefly of an artificial bitumen extracted from petroleum to which are added small quantities of natural bitumen, chalk and resin. One side is sanded to prevent adhesion when the cloth is rolled up; and the sanded side is placed uppermost. The bitumenized cloth is laid in continuous length across the lower side of a sloping roof, and then another length above it with a lap of about three inches, and so on over the whole surface the uppermost length being bent over the two sides to form the ridge. The cloth is held down directly to the rafters, which may be spaced twelve or fifteen inches apart, by washers of the same material secured by zinc nails. The maker asserts that his roofing cloth is unaffected by heat, and that it forms the lightest roof in the market.

Petroleum is also pressed into the service of the building trade by Rave, Annez & Co., of Mechlin — the old city whose lace is a thing of the past, being superseded by oak carving in imitation of the antique. These makers have patented a process for preparing, from petroleum, a drying oil for painting claiming that, while being fifty per cent cheaper than linseed oil and dryers, it is not unwholesome in manufacture or application, and permits of several coats being laid in the same day, so that work in a hurry may be pushed on apace. It appears that this mineral oil will unite chemically with all but two colors (for which substitutes are found), when in a finely divided state without the necessity of grinding, as usual; and this is the only drying oil which may be easily applied to cement, so as actually to combine with it. The oil also serves as a varnish at one-fourth the cost, and may be laid on tarred or bitumenized surfaces, without their showing through.

The exhibition is proving highly successful and attractive; and lectures connected more or less directly with the exhibits are given weekly. Thus, M. Wellens, Inspector General of Ponts et Chaussées, and President of the Belgian Society of Engineers, has lectured on the materials employed in the construction of the Brussels Palais de Justice; M. Rutot, Conservator of the Natural History Museum, on the origin and mode of formation of the sedimentary rocks; and M. de Schryver, Ingénieur Principal des Ponts et Chaussées, on Portland-cement mortar and concrete. J. W. P.

TRADES-UNIONS IN AMERICA.



TRADES-UNIONS and labor organizations are of recent growth in America, and their rise marks an altered condition in the social arrangements of the States. In a country where equality reigns sufficiently to render the intercourse of master and man perfectly free from restraint, where capital is fairly diffused, and where land, the great source of wealth, stands ready for all who can accumulate the small sum necessary to build a rude home, and maintain it until the first harvest, there is little incentive for men to form class combinations. Hope bids them cast their eyes forward to a better and more independent condition, where the close of each week will see them not only provided with subsistence for the next, but with something added to their home or personal surroundings which shall be a pleasure or a convenience for the remainder of their lives. The troubles of the present are thus borne with equanimity, since they receive only partial attention, and form but a stepping-stone in the path to the more prosperous condition of the future. If real grievances exist, there is no obstacle to laying them before the employer, for he is always to be met with, and a discussion of the situation will find a remedy or demonstrate the necessity of bearing the infliction, whatever it may be, until one of the frequent changes which occur so rapidly in new countries, brings relief. When the best men in a workshop are ever breaking out of the ranks, and abandoning their class, and many of the remainder imagine that some day the same chance will come to them, there is no material upon which to found an organization framed to defend the laborer from the capitalist, and to secure to the former a larger share of profits than he would otherwise get. It is only when workmen realize that there is practically no hope for them to exchange their calling for a better, and when they lose acquaintance with their employer, that they bind themselves together in a union, and endure all the discipline and self-sacrifice it involves. In England unionism can be traced, in some form or other, back to the time of Edward VI., and represents the efforts made by the craftsmen to free themselves from a condition which was little better than the villeinage of the feudal age; it was created by repressive legislation which gave the workman his choice between an arbitrary wage settled by the magistrate, the branding iron, and the gibbet, and it has endured in spite of the law, the pulpit, and the press, until it has become one of the most powerful industrial forces of the time. In America the potent factor to weld labor into a compact body has been the accumulation of wealth in the hands of individuals and corporations. The small manufacturer is rapidly disappearing; trade rivals, armed with all the advantages of unlimited credit, struggle with each other for the monopoly of the market, and in their conflict they heedlessly stamp him out of existence. And with him goes the kindly feeling which had grown out of the personal contact of employer and employed, and also the principal ladder on which the workman hoped to rise to competence. The land, too, has ceased to offer the attractions it once did. Every year it recedes farther westward, and even there the capitalist grows omnipotent; cattle are raised by thousands on ranches covering hundreds of square miles, and owned by men who live at ease in New York and London; huge sections of country are in the hands of the railway companies, who retail them at comparatively high prices; and wheat has fallen to a figure which scarcely leaves a profit to the man whose land extends as far as the eye can reach, and who commands the best appliances of the day. On all sides the horizon closes in on the poor man; it is true that he has greater comfort than ever before in the world's history; he is better fed, better clothed and better lodged; he has more leisure, and can fill his spare hours with all the resources of literature, while he can enjoy no inconsiderable share of the beauties of nature and art, if he have the appreciation for them. But the doors of hope are closed against him.

Speaking generally, the workmen can never escape from his daily toil and cannot rise in the social scale. The aggregation of capital which characterizes the present age, has doubled his physical comfort and his capacity for intellectual enjoyment, but it has robbed him of the flattering unction with which he once nourished his soul that he could enter the class above him. Who shall appraise the good and the harm it has done him, and strike a balance between the two? The ingenuity of the poet could find no characteristic of Inferno to write over its portals more descriptive than its hopelessness, and certain it is that the working classes have a far keener sense of the loss, sentimental though it may be, that capital has brought them, than they have of the gains they reap from it. In America they have abandoned the position of careless confidence they formerly held, and by welding themselves into unions now meet the employers in pitched fight and extort their full share of all present profits.

Statistics regarding labor organizations are not available for the whole of the United States, but we may take Illinois as a representative State, and trace the rise and development of trade-unionism there, as a type of the whole country. The most notable feature in labor organizations is the Order of the Knights of Labor, whose fame has spread even to this country. The Order is not strictly a trade-union, as it is not confined to members of specific callings, but embraces persons of all occupations, with the exception of bankers, lawyers, gamblers, and liquor dealers, who are excluded. Among the ranks are found men of all trades — merchants, farmers, teachers, officials, editors, and professional men — but the bulk of the members are of the industrial classes — mechanics, artisans, clerks, miners, and laborers. Out of 32,857 Knights of Labor in Illinois, 70 per cent are skilled workmen, 26 unskilled, and 4 per cent neither. The object of the Order is not to champion any particular section of the industrial army, but to gather them all under the banner of a modern knight-errantry, which shall charge itself with the welfare of all classes, be they skilled or unskilled, male or female, black or white. The leading features of the knights' programme are the modification of all laws which are prejudicial to labor, and the substitution of arbitration for strikes. This latter point will come as a surprise to most, for it is in connection with strikes that the Order has been oftenest heard of. It goes forth full of persuasion, but when capital turns a deaf ear to its conjuring, the energy of youth hurries it on, and it strikes both hard and widely, having neither the experience nor the caution of the older unions.

The organization of the Knights of Labor is conceived on a broad basis, to suit its aspirations, which are national in their width. The primal formation is the local assembly. As these multiply they contribute representatives to district assemblies and State assemblies, and these in turn combine to form the General Assembly, the ultimate governing authority. The Order is not confined to towns, the homes of unionism, but has spread into villages, where it has made many converts, adding to its strength until it equals all other labor organizations united. The very success of the Order renders it difficult to give an accurate estimate of its numbers, for they are increasing daily, and the figures at our command, which are published by the Bureau of Labor, only extend up to last July. At that time there were 204 local assemblies of Knights of Labor in Illinois, distributed throughout 51 of the 102 counties of the State. The original membership of all these assemblies was 6,899, while the number a year ago was 34,974. It is estimated that 300 assemblies were in existence at the close of 1886, and that they comprised 52,461 members. To obtain an idea of the power of the Order, we must compare its numbers with those of the entire industrial population. This cannot be done exactly; but still there are a good many figures available which will serve as a rough basis of comparison. In the first place the trades-unions of Illinois comprise 61,904 members, about 17 per cent of whom are also Knights of Labor; then the last returns for the coal-fields show a total engaged in mining of 25,846; the men employed on the railroads were found by the Bureau of Labor statistics to amount to 43,651 in 1882; and in 1880 the census tables showed 120,558 males employed in the manufactures of Illinois. Omitting the unionists, who, of course, are counted in the census, we find that in the three great divisions of manufacturing, mining, and industry, there is an aggregate which must be much understated at 190,000, of whom rather less than a fourth are Knights of Labor.

The first assembly of the Order was organized in 1877, and up to the end of 1881 its progress was so slow that there were only nine assemblies. Then the increase became rapid, there being 60 assemblies in 1884, 110 in 1885, and 204 in July, 1886. Of those assemblies, 55 are formed of members of specific occupations, while the remainder comprise a variety of occupations. It is curious to note the distribution of nationality of the members, as shown by the annexed table:

Americans	15,241
Germans	6,199
Irish	4,919
Scandinavian	1,955
English	2,287
Poles	943
Bohemian	1,657
Scotch	175
Italian	103
Welsh	65
Unreported	1,430
	34,974

The native-born Americans do not constitute one-half of the whole, although they enter this organization more freely than the unions, on account of its requiring no standard of craftsmanship, and from its political aspirations. The keen youth of the country has read the signs of the times so well that he selects occupations in which a living is made by the wits in preference to handicraft, for the former offer a far more hopeful prospect to the man anxious to get on than the latter, as they provide chances which can be filled by shrewdness and industry, while the few openings in manufactures demand much accumulated technical knowledge and a scientific education. We therefore find that four-fifths of the mechanics and artisans of Illinois are of foreign antecedents and habits.

We have given so much space to the Order of the Knights of Labor that we shall have to curtail our account of the trades-unions. This, however, is of less consequence, as they are to a great extent copies of similar organizations in this country. Few of them are old, while a great number are quite recent, the idea of combination having received a great stimulus from the success of the Knights of Labor and from the eight hours' movement.

Of the whole number, 226 organizations have been established during the last five-and-a-half years, and less than one-fifth are of earlier origin. But within this period much the greater progress has been developed during the year-and-a-half preceding last July. In 1885 and the first six months of 1886, 140 out of 226 organizations came into existence, and more than half of these in the latter period. The older unions are those of printers, iron-moulders, tailors, carpenters, locomotive-drivers, stone-cutters, and cigar-makers, all of whom were established in the decade, 1860–70. Between 1870 and 1880 the locomotive-firemen, glass-blowers, plasterers, furniture-workers, hod-carriers, seamen, bricklayers, metal-workers, and others appeared; while in the latter period since 1880 the spirit of organization has not only spread among the classes named, but has pervaded all classes in which there was any community of interests upon which to unite.

In the State of Illinois 483 labor organizations have been tabulated, and 125 of these report 212 strikes as having taken place within their experience, involving 50,522 men. Of those contests 86 were carried to a successful issue, 31 were compromised upon some basis of mutual concession, 63 failed, and 28 were unsettled at the time of the report. On the whole, the American unions appear more ready to fight than those at home, not having acquired the experience which comes with age, and probably not receiving the consideration extended to them here. Manufacturers are very apt to resent the interference of delegates on their first appearance, and to precipitate a conflict, hoping to crush the union before it has become firmly established. Of all the races which people the States, the Germans appear to take most naturally to trades-unions. Their natural clannishness and the habits of forming clubs, n odoubt, contributes to this, while their home training prepares them for the discipline and surveilance of the union. The Irish are next in number to the Germans, and nearly equal the Americans in the various trades-unions. They prevail in the railroad business, both on the road and in the yards and freight-houses, but more particularly in the stationary service. They also constitute the majority of the bricklayers, stone-masons and plasterers, but strange to say that as hod-carriers they are outnumbered by the Germans, though only second to them. The fact of Germans ranking below the Irish in the industrial scale is one that would not be received, if it were not vouched for by the official publication of the State of Illinois. — *Engineering.*

BOOKS AND PAPERS.

"THE ESSENTIALS OF PERSPECTIVE,"[1] by Mr. L. W. Miller, is an informal treatise for the use of the artist (painter we presume), or the draughtsman. It is ingeniously illustrated by examples which appeal to general experience in nature and by cases of actual practice, or malpractice — more often the last — in the works of painters. Its merit is in the directness and freshness of its presentation of the subject, especially its boldness in bringing in from the start, and as a matter of course, certain ideas which are usually carefully shunned in rudimentary treatises — the vanishing-lines of planes, and the determination of vanishing-points by secondary horizons. These are conceptions which are essential to any real understanding of perspective phenomena, but are kept out of sight in the ordinary text-books, and invested with unnecessary awe, through the same mistaken timidity which confines the ordinary pupil's study of geometry almost exclusively to plane geometry, and so defrauds him of the ideas which most give point and practical meaning to his study. If the working out of the book were as good as its idea, it would be a valuable substitute for the worthless treatises on perspective which abound.

Most of these treatises assume that the essence of perspective, and also its chief difficulties lie in its processes, and that if they can cut these down to a few rules-of-thumb, the true object of the study will be secured and its hardships evaded, without wasting the learner's time on general conceptions. On the contrary, the real difficulty, and also the real use and value are in the conceptions. The artist who has mastered them is better off without any process at all than he who has not, though with all the practical devices of the books at his disposal. Moreover, when he has mastered them it is an easy matter for him to simplify or multiply his processes according to the needs of his work. To acquire and order these conceptions is the chief labor of learner and teacher, and in this is commonly the chief failure of both. A recognition of this fact seems to have been Mr. Miller's motive. He gives considerable pains to making clear the first ideas of perspective conditions, and to clearing up misconceptions and nonconceptions which are common among painters as well as people who are not painters. But his scheme, which is a good one, is carried out with too little thought, and the workmanship of his book is careless, which, in books of this kind, is the common offence, and a grave one. If the author of such a book thinks he can make it more attractive by a free-and-easy style, he is at liberty to; but he is none the less bound to see that his ideas are well and clearly arranged, his thought exact, and his language precise, however free it may be. Some parts of this book have been well thought out, and many of the illustrations studied with a care and clearness that make them admirably effective. But the texture of it is loose; much of the discussion too summary to be clear, holes are left unstopped which the pupil may not see, but ought, and the affectation of carelessness in the style may easily persuade him, to his injury, that there is nothing in the subject after all that requires much care. The result is that some of the explanations can hardly be understood by one who does not know the subject; many things are referred to or assumed that are not explained, others are hinted at and not worked out, and here and there are downright blunders which, as the rest of the work shows, can only be the result of carelessness.

Thus, in describing parallel perspective Mr. Miller does not take the pains to show that it belongs to systems of lines at right angles, parallel and perpendicular to the picture; nor that most of the constructions of perspective, especially the "two-point" and "three-point" systems, which he specifies, are based on the right angle. In his haste to generalize he does not even make it clear to his learner that the centre is the vanishing-point of lines perpendicular to the picture. In many cases, to save the learner trouble, he contents himself with showing him a construction which gives a drawing consistent with itself, and therefore possible, but does not tell him how to determine an actual case, nor hint at any difference. The chapter on measuring, good in its scheme, does not make clear the essential difference between two methods — one applying to lines parallel

[1] "*The Essentials of Perspective*," with illustrations drawn by the author. By L. W. Miller, principal of the School of Industrial Art of the Pennsylvania Museum, Philadelphia. New York: Charles Scribner's Sons, 1887.

to the picture, the others to those at an angle with it. The tyro will find it not easy to understand the chapters on shadows and reflections, or to get practicable methods from them, though he will get many good ideas of the phenomena. That on circles is loose and inadequate: it gives but one construction for the circle, and that might be simpler, for it requires the use af a plan; nor is his attention called to the important question, what becomes of the centre of the circle? or to the phenomena constantly occurring and constantly misrepresented in drawing of circles with a common axis, as on the surface of a cylinder. On the other hand, the chapter on curvilinear perspective is excellent, although we think that when he assumes to correct Ruskin, the author misrepresents Turner as much in one way as Ruskin does in another.

It is simple carelessness to make on page 9 a proposition which implies that all the lines oblique to the picture tend to one vanishing-point, and to say, on page 13, a flat surface for a level one. Page 75 tells us that "the shadow of a line on a surface to which it is parallel is always parallel to the line itself," which can only be said of straight lines and planes. The next page should say, "the shadow of any plane figure on a *plane*," etc. The statement on page 61 that the axis of the ellipse is at right angles to the axis of the wheel is true only in special cases; as a general statement it is untrue, as may be easily seen if we consider the case of a shafting pulley above the eye, and in a plane at right angles to the picture — a very ordinary case — where the axle of the wheel must be drawn parallel to the horizon-line, but the axis of the ellipse will incline toward the centre of the picture, or, as Mr. Miller properly calls it, the centre of vision.

On the whole, Mr. Miller's book is one of those which disappoint because they seem capable of being better than they are. It should be a stimulating book, for it is full of shrewd observation of natural phenomena, and remarks which should open the eyes of the novice to many things that clear eyes ought to see, but even painters often overlook. If it is understood, it ought to help the young painter materially in ordinary sketching; but its easy-going discussion is likely to encourage looseness of conception, and favor rather than forbid that contempt for the precision of the perspective which the author deprecates in his preface; while its processes are too inexact for the uses of exact draughtsmanship. We should advise artists or draughtsmen to read Mr. Miller's book, and then to learn the practice of perspective elsewhere.

NOTES AND CLIPPINGS

RENEWAL OF ROOF OF KING'S CROSS TERMINUS. — At a meeting of the Society of Engineers, held on the 6th of June at the Westminster Town Hall, a paper was read on the "Renewal of Roof over Departure Platform at King's Cross Terminus G. N. R.," by Mr. R. M. Bancroft.

A brief history and description was given of the construction of the old laminated timber roof, erected in 1851–2, according to the system introduced by Colonel Emy, a French military engineer. After pointing out the entire absence of ventilation in the old roof, and other causes of decay, the author describes the movable staging now being employed in the erection of the ribs of the new iron roof, the way in which it is moved from bay to bay as the work proceeds, and the means adopted for supporting the superstructure of staging so as to give a clear headway for locomotives, etc., and not to interfere with the departure passenger traffic. Reference was then made to a similar roof over the old G. N. R. passenger station at Bradford, its span, distance apart of main ribs, and weight per bay of 20 feet being given. The construction, hoisting, and fixing in place of the new wrought-iron ribs were described; and it was pointed out that they have to be made to fit the existing cast-iron spandrels and stanchions built into station-walls. The construction and fixing of the lattice and trussed purlins, and the gangways adopted to give greater facilities for workmen in repairing and cleaning the glass covering were also described. The author remarked on the absence of wind-bracing, and gave the reasons for not using it. He also described the method of glazing, both with putty for the roof generally, and with Helliwell's patent puttyless glazing at the Louvre. Diagrams were exhibited showing the general form of the roof and the movable staging, and the working drawings were also laid upon the table for reference, by the kind permission of Mr. Richard Johnson, M. Inst. C.E., Chief Engineer of the G. N. R., under whose instructions the work is being carried out.

MALTREATMENT OF THE "CORONATION CHAIR." — "We shall not know how much harm has been done to Westminster Abbey in preparing it for the royal thanksgiving service until the scaffolds have been removed," says the London *Athenæum*. "More care, it is believed, has been taken than on some previous occasions, but one wanton piece of mischief has certainly been committed. We shall scarcely be believed when we say that the Coronation Chair, perhaps to most Englishmen the most precious of all the precious relics in the Abbey, was handed over to some barbarian to be smartened up, and he has daubed it the orthodox Wardour-Street brown, and varnished it! Yet this is true. The chair, made 600 years ago to contain the stone which even then had a long story behind it, has suffered much from hard usage and from the hands of the mischievous. But not even in the perilous time when George IV was crowned was it attempted to take away the chair's age and make a new thing of it. Now, when we pride ourselves on knowing more about old art work than our fathers did, this has been done, and the throne of twenty-six monarchs has been vulgarized into the semblance of the hall chair of a Cockney Gothic villa."

RECENT EARTHQUAKE-SHOCKS IN JAPAN. — Professor Sekiya of the Japanese Imperial University who has been investigating the recent earthquake in Japan, recently read a paper before the Seismological Society giving the result of his observations. A narrow axis or band of country, running near to the coast and nearly parallel to its general trend, for about thirty miles, and reaching the shore at Yokohama, is described by Professor Sekiya as the seat or origin of violent emotion. As in some future heavy shocks in this country, the area of destructive effect was found to be limited to a small breadth on either side of the axis, so that places as little as two or three miles to the north or south of it experienced a well-marked diminution of seismic energy. The earthquake was preceded by the usual warning roar or rumbling, as of distant cannon, emanating apparently from the western part of the central band. Respecting the cause of the shock, Professor Sekiya believes it to have been a faulting or dislocation of strata in the earth's crust, a conclusion to which the geological and other physical features of at least the western half of the axial band lend considerable support. If he be correct, we have in this case a variation from the probable most common cause of Japanese earthquakes, which, according to Professor Milne, is underground explosion of steam. All along the central band, and more conspicuous in the western and hilly half than in the eastern, which is low tableland, the effects of the earthquake was strongly marked. In the former, fissures and landslips were very numerous. Professor Sekiya counted no fewer than 72 cracks in a distance of 7 miles, one of them being a foot wide and 500 feet long. and all of them running parallel to the axis of origin, which is also parallel to the main topographical features. In the same region, which abounds with villages and hamlets, the effects generally reached their greatest intensity. The sliding screens, covered with paper or of wood, which serve as doors, shutters, partitions, and windows in Japanese dwellings, were bent, broken, and shot out of their grooves. The paper covering or glazing of some partitions were rent and shivered in an extraordinary fashion, such as no other conceivable power could have brought about. Houses were cracked, mutilated, unroofed, twisted, tilted up, and more or less wrecked. Those of wood framing and heavily plastered suffered especially as to their walls. Yet, strange to say, though thousands of buildings were left tottering on the verge of demolition, apparently needing but a puff of wind to blow them over, only two were actually levelled to the ground. Several wells became turbid. In some of artesian character the water decreased permanently or failed altogether; in others it increased. One large river was so strongly agitated that the ferry-boat could not be taken across it for some time after the shock. The peasants say that they felt as if standing on waves of the sea. Many persons were thrown down; and one scared countryman vouches to having been obliged to crawl on all fours, owing to the impossibility of walking upright. To all these things were added the noise of the earthquake's ruthless work and the shrieks of affrighted women and children. At Yokohama the effects on buildings were corroborative of all that Professor Milne has, from time to time, told the world with regard to construction in earthquake countries. Houses in that town are of so many types that they afford a fair field for comparisons of results. Most happily, the intensity there was only one-third as great as in the hill region on the west. Had the maximum intensity reached Yokohama, it is more than likely that not a chimney would have been left standing, and that, in the foreign quarter at least, there would have been heavy ruin and loss of life. To sum up the conclusions deducible on the recent occasion and confirming all previous experience, it is now more than ever clear that the buildings of the composite construction common in this country, such as wood encased with brick or stone, are the earthquake's happiest playground. They are embodiments of the cardinal error of rigid attachment of parts of a building which have different periods of vibration — *i.e.*, which swing at different rates during earthquake shocks. Houses of weak construction — for example, of thin brickwork or wood and plaster — and houses built of bad materials or on faulty principles are also dangerous. But the composite houses are mere earthquake traps. Wooden structures, like the ordinary Japanese dwelling, are well enough — perhaps better than any as far as earthquakes alone are concerned, if thoroughly-well constructed. In Japan, however, fire is a more constant and even more dread enemy than the earthquake, and the latter often brings fire in its train as a result of the overthrowing of lamps. Sheet-iron houses, as used in Australia, would be strong, cheap, and effectual, but they have the drawbacks of ugliness, difficulty in providing against extremes of temperature and danger of typhoons. On the whole, it appears to be the conclusion of our seismologists that solid, heavy buildings of stone or brick, with their various parts well constructed, strengthened, tied and bonded on true principles of architecture, and with due knowledge of the strength of materials, are the best and safest for earthquake-ridden countries. The forces to be dealt with are forces altogether independent of gravity, and for the most part act in a horizontal direction, and architects and builders must apply the resources of their art accordingly.

MAYALL'S PHOTOGRAPHIC DISCOVERY. — The photographic as well as the daily press of England seems now to be much exercised over the "Mayall Process," although it claims nothing more than to be the means by which photographs may be rapidly colored by those who need not have great artistic ability.

An outline of his method may serve to give some idea of its merits. It will, probably, like many of its predecessors, meet with a wide appreciation in certain photographic circles, at least for a time.

The negatives, made on orthochromatic plates, are not retouched, In order to obtain the best results a solar camera print is made, toned and fixed in the usual manner. The print, after leaving the hypo-bath, is subjected to the action of a solution, which transforms the silver forming the image into silver oxide and at the same time entirely eliminates the hypo by chemical action. The colors used in the tinting are entirely new (albumen probably), and form part of Mr. Mayall's discovery. They are beautifully transparent, and when applied to the surface of the print unite with the image, forming a colored silver compound, which there is good reason

to believe is absolutely permanent. The print is then placed face upwards, in an air-tight box, into which silcon, in a state of impalpable powder, is blown. When this has subsided and formed a layer on the picture, it is carefully coated with salicylic acid, and the whole, image, leaves the paper support, and can be applied to the decoration of any colors and film unite to form a kind of flexible glass which, when dry, material. The process being altogether different from anything heretofore practiced, has at least a claim for novelty, and, as the pictures are said to possess rare beauty, there may be a popular future for them. But they are not photographs in natural colors as we understand that term. — *New York Photographic Times.*

The Sewage System for San Diego, Cal. — The *Sanitary News* describes a somewhat novel plan for disposing of sewage in the system which Colonel Waring has engaged to build for San Diego, Cal., at a cost of about $400,000. The main sewer runs a quarter of a mile into the harbor to an outlet-reservoir constructed alongside the deep ship-channel. The reservoir will have an area of one acre, and cost some $50,000. The collected sewage will fill this reservoir not more than one-and-a-half feet deep. High tide will add three-and-a-half feet of sea-water to the mass. The contents thus diluted will be discharged into the outgoing tide by automatic gates opening an hour after high tide, and closing an hour before low tide. At Stockton and Sacramento, where the conditions are nearly identical, Colonel Waring will make wells in various flat parts of the cities, connecting with a deep outlet-well by large siphons Colonel Waring has used this plan for two years successfully at Norfolk, Va. At Los Angeles he recommends the purchase of 10,000 acres of land six miles from the city, and the disposal of the sewage upon it by irrigation.

Gallic Burying Ground at St. Maur, France. — Archæologists and antiquarians will rejoice to hear that an important discovery has been made near the town of Adamville. A few days ago a Paris architect, M. Macé, was superintending some alterations in the Park of St. Maur when his men suddenly dug up some mouldering bones. The architect immediately stopped the works, and, jumping into the trench which had been dug, began to scoop out with his own hands what appeared to be parts of skeletons. He next disinterred an iron lance-head, the form of which and its incrustation of rust denoted its antiquity. M. Macé now set his men to work again, and they soon brought to light a large collection of swords, helms, lances, and bracelets. Next came a row of tombs, which looked as if they had been hastily built and arranged without order. It is supposed that the place was the burying ground of the Bagaudi, a tribe of ancient Gauls who were driven from the mountains of Auvergne, by Maximian, and were shut up in St. Maur. That town was, in fact, called St. Maur-les-Fosses, owing to the cuttings made by the Romans, and Adamville was known of old as the camp of the Bagaudi. The Bagaudi remained in possession of their intrenchment on the little peninsula of St. Maur, and their dead, who were numerous, were buried after the Romans left. It is also supposed that some of the famous Theban Legion, which was massacred by Diocletian, escaped to St. Maur. Some of the arms and bracelets which have been discovered are in a good state of preservation. — *London Daily Telegraph.*

Compensation for Injuries to Workmen. — At a recent meeting in Berlin of surgeons attached to railway workshops, a scale of unfitness for work was drawn up. A standard of 100 per cent was agreed to as representing the loss of both eyes, both arms or hands, both legs or feet, and one arm or hand and one foot. The remaining possible injuries were classified as follows: Right hand, 60 per cent; one foot, 50 per cent; left hand, 40 per cent; right thumb, 33⅓ per cent; one eye, 22 per cent; left thumb, 14 per cent; first finger of right hand, 14 per cent; first finger of left hand, 8 per cent; any other finger of right hand, 6 per cent; any other finger of left hand, 4 per cent. It is remarked by the *Colorist*, of Vienna, that the valuation of the right thumb at 11¼ per cent more than one eye is curious.

Centennary Monument for New South Wales. — An imposing centennial monument is being planned by New South Wales. According to the model the memorial would be 100 feet high — a foot for each year of the colony's existence — and as broad as it is high; while all the material will be colonial. The rising sun will be at the top of the main structure, surmounted by a globe bearing a figure of Great Australia uniting the colonies. Four fountains represent the four great rivers of the colony, and allegorical figures and bas-reliefs, types of the respective natives, and designs illustrating the advance of New South Wales will adorn the monument. — *New York Evening Post.*

Measuring Deflection. — A novel method of measuring the deflection of railroad bridges has been tried in Russia. An iron pipe one-and-half inches in diameter was carried along the outside of one girder. From this pipe, on each abutment at the pier, and at five intermediate points in each span, vertical pipes of the same diameter branched out. Inside, and near the top of each vertical pipe, was fixed a graduated three-quarter-inch glass tube, the iron pipe being cut away on both sides. The zero divisions on the tubes were all the same distance above the flange of the girder. Before the bridge was loaded the apparatus was filled with water, the tops of the upright pipes covered over, and the water was then drawn off until it stood at zero in each guage. On the bridge being loaded the deflection could be read with ease.

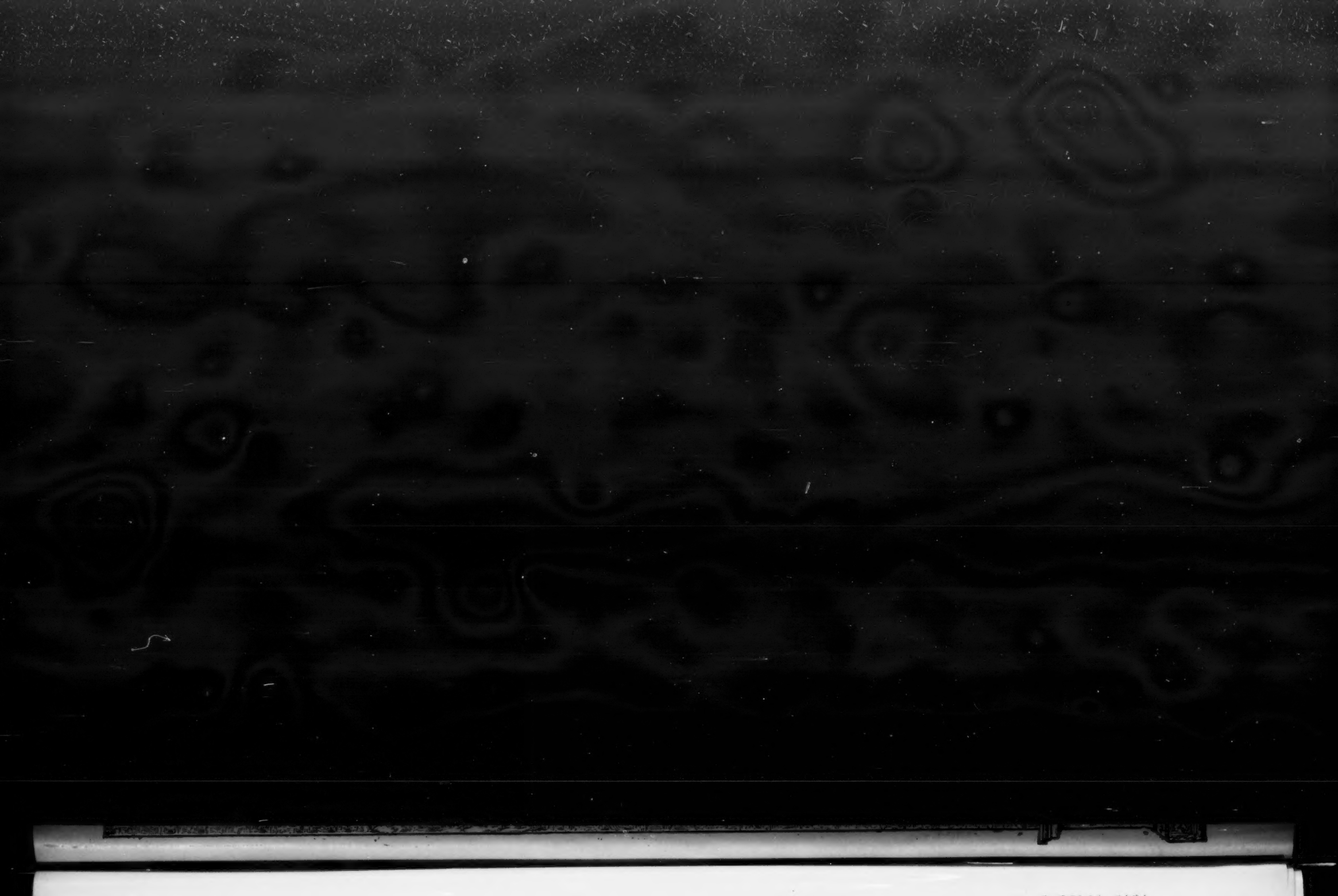
Eucalyptus Roots. — A man dug a well 25 feet from a eucalyptus tree, lined it with cement, and placed over it a substantial cover. The water was carried to the house from the well in a wooden pipe. In that wooden pipe was a knot-hole. In time the well began to give out. The water, too, was acquiring a strange taste. Explorations developed the fact that the well had been filled up with masses of eucalyptus roots. The tree had run a root straight for the knot-hole, 25 feet off, and by that method gained the well itself. — *San Francisco Bulletin.*

Moulders' Sand. — The region around Albany, N. Y., furnishes the largest part of the moulding-sand used in the United States. It is found in deposits from one-and-one-half to two-and-one-half feet deep, for four or five miles back from the river on the west side of the Hudson, as far south as Coxsackie, and on both sides of the Mohawk up as far as Schenectady. There are three grades, brass and stove castings using the finest, and bridge-girders, etc., the coarsest. Along the Mohawk it is shipped in bulk in cars, elsewhere mostly in canal-boats and schooners; $500 per acre is often paid for the privilege of taking the sand from the land. In dry seasons it can be dug and shipped at once, but its quality is better when it is piled up and left over one winter. — *New York Evening Post.*

TRADE SURVEYS

The month of July has brought with it more business to the wholesalers and retailers than usual. Jobbers and travellers who are supposed to know the actual market conditions well have been saying all along that the summer business would be large and fairly remunerative in all channels of trade. Large buyers are unwilling to wait until the month of August before ordering supplies for the next three or four months, as is customary in many branches of trade, and for this encouraging reason that by that time it is probable the mills, shops, and factories of the United States will have their fall capacity pretty well taken up. The greatest activity is among the manufacturers of all kinds of machinery and railway materials and supplies. Many railroad companies are unable to furnish cars or engines as fast as wanted, and since July 1 orders have been placed for nearly 200 large and small locomotives, besides a large number of cars and railway appliances. Inquiry at leading machinery centres and among the leading locomotive and car builders, shows that the activity in this direction is far behind the demands. There is greater activity in railroad building this month than last, and a rush of orders, such as in May or June, would have had the effect of advancing prices. Large consumers have about completed their estimates of requirements for the rest of the year. During the next thirty days the bulk of the requirements so far as estimated, will be covered. If we escape an advance until the middle of August it is not probable that fluctuations will occur after that date in the leading staple products. There is an undertone all through the market that the producing capacity will take care of consumers, and that no speculative advance is probable. The latest railroad earnings reported show an increase. Money is flowing both eastward and westward. Enterprise is not checked for want of encouragement. Building activity continues in all Western cities, and real-estate speculation has come to a stand where both sides will have a needed breathing spell. The iron trade is in a vigorous condition. A 25,000-ton lot of steel rails was taken by an American mill at $37.50 to keep it from going abroad. Contracts will be closed for 20,000 tons of bridge-iron this month to be erected in the winter on Eastern and Western rivers. Several orders for iron and steel have gone abroad, a result which is causing complaint among home iron interests. The anthracite coal trade will be 2,000,000 tons ahead of last years' output on August 1, by which time an advance of from ten to twenty-five per cent per ton will have been ordered on the remaining 14,000,000 tons of coal to be moved this year from that date. The bituminous trade East and West is expanding under the increasing manufacturing demand. The lumber-trade furnishes further evidences that prices are hardening, especially in the West and Northwest. As yet, the only effect in Eastern markets has been a hardening of prices in retail circles. All Western cities are absorbing lumber exceedingly fast. Kansas City alone will absorb 15,000,000 M. in buildings. A Lumbermans' Convention at Minneapolis advanced prices $1 per M., while a committee was appointed to consider the advisability of it.

The latest advices from architects in the interior seems to harmonize on the statement that prices of material and labor have not as yet discouraged house-building, but that manufacturing enterprise is looking ahead with some additional caution. Low prices encourage enterprise, and exceptionally high prices act as an inducement to await a reaction which business-experience and good judgment seem to anticipate. As a rule, the architects are busy. The solution of the labor-trouble in Chicago, practically speaking, is welcomed by thousands of builders, but there are not a few who would have preferred to see the question at issue fought out to the bitter end. This labor question can never be settled by unwise concessions or compromises. The iron and steel manufacturers of the United States tried concessions, and the result was and is the formation of a trades-union among the iron makers, whose expressed wish has for fifteen or more years been its edict. Labor at large, however, is more conservative. The fever of striking is subsiding. The leaders are anxious for a little rest. The conservative rank and file are becoming sick of assessments and of idleness. There is a feeling that has been smothered under the machinery of organization and lodge and assembly dictation, viz., that of a desire for a direct and personal relation with employers. This tendency will grow, and is one of the internal influences that will check what might otherwise be the absolute supremacy of centralized labor authority. Each man desires to preserve a little remnant of independence, and there have recently been numerous evidences that this feeling exists. For the rest of the year it is probable that there will be little to disturb the friendly relations of employers and employed. The leaders prefer to husband their resources for another year.

The builders in all the larger cities are crowded with work. Investors have not felt like curtailing operations or of dropping projected enterprise. The brickmakers in all parts of the country are crowded for supplies. Late reports from marble and stone and slate quarries coming down to July 1 show a half year of almost phenomenal activity. Prices have not dropped to the almost unremunerative level of 1886. In fact, the opening of new sources of supply, and the liberal expenditure of money go to show the season has been exceptionally good. The better qualities of stone are contracted for far ahead, and the quarries will be worked to their fullest capacity. The old sources of supply have not suffered on account of the competition of the new. Architects encourage the increasing use of stone in dwelling houses, and there is a growing popular appreciation of stone over brick. Valuable beds of building-stone and of marble are being opened in the Southern States this year, and if the question of transportation does not interfere they will be developed on a large scale by the confident companies behind them.

The favorable crop reports, the light stocks, the heavy demand, the general confidence, all point to better conditions, though not necessarily wider margins. Production is being carefully organized, and each new screw and nut in this complex machinery helps to strengthen the intricate system of production and exchange, of which our industries are a part.